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(54) Title: METHODS OF ESTABLISHING INTERCELLULAR COMMUNICATION IN AN ENDOTHELIAL CELL LAYER AND USES THEREOF

(57) Abstract: The present invention provides methods for generating endothelial cells *in vitro*, with functional intercellular communication (e.g. GJIC) that is consistent with normal endothelial cells and cell layers *in vivo*. In accordance with the invention, expression and appropriate organization of gap junctional proteins in endothelial cells is achieved through a) biophysical engineering, b) genetic engineering, or c) a combination of both biophysical engineering and genetic engineering. The fully functioning endothelial cells generated *in vitro*, in accordance with the invention are suitable for use in conjunction with substrates and matrices commonly used in tissue engineering of vascular implants and are of the prior art.